

the dog G. This dog will prevent the disk D and consequently the armature shaft from turning; and as the driving member B is still further turned, the spring F will be put under tension, and this will continue until the knock-off arm K is turned around and hits the arm  $g^2$  of the dog G. By this engagement, the dog will be pushed outward and disengaged from shoulder  $d'$ . Thereupon since the armature shaft is now free from restraint, it will be turned rapidly forward by the tensioned spring F, and this rapid movement will continue until the armature shaft has caught up with the rotatable member B. By this quick forward movement of the armature shaft, the kick off sparks will be produced. In order that the device may not be racked by this quick movement, a spring buffer M is provided. This is a short plunger which is movably mounted in a lug  $d^3$  fixed to the disk  $d$  and projecting through this lug into a position where it may engage the kick-off arm K when the disk  $d$  has caught up with the housing  $b$ . The spring  $m$  which resists the movement of this buffer plunger which results from its contact with the kick-off arm, is also utilized to impart the required engaging movement to the pawl E, said spring being compressed between the shoulder on the buffer and the tail of the pawl E.

The described movement of the parts will be repeated as long as the engine is being slowly turned over. When, however, the engine gets fairly started and attains a suitable speed, the blows from the knock off arm K against the arm  $g^2$  of the dog will be sufficiently forceful to swing the dog out so far that the latch J will fly down behind the upper end  $g'$  of the dog, and thereby hold it in inoperative position substantially as shown in Fig. 1.

A spring N of the rat trap variety, may be employed to impart to the latch its movement in the latching direction and also to impart to the dog some force tending to supplement the action of gravity in moving this dog to the position where it will engage with the shoulder  $d'$ .

Having described my invention, I claim:

1. The combination with the armature shaft of a magneto, of a driving member concentric with the shaft, said driving member having an enlarged cup shaped portion, a coiled spring surrounding the shaft and within said cup shaped portion of the driving member, said spring being operatively connected at opposite ends to the driving shaft and the driving member, a device for preventing rotation of the armature shaft, and means carried by the driving member for displacing said preventing device, substantially as described.

2. The combination with the armature shaft of a magneto, a concentric driving

member, a spring pawl carried by one of said members and having a beveled end which enters a beveled notch in the other member, and a spring through which motion is transmitted from the driving member to the armature shaft, of a device to temporarily prevent the turning of said armature shaft, means carried by the driving member for moving said device to an inoperative position whereby the armature shaft may move quickly forward by said spring relatively to the driving member, and a spring buffer for yieldingly stopping said forward movement of the armature shaft relative to the driving member.

3. The combination with the armature shaft of a magneto, a concentric driving member, and a spring through which motion is transmitted from the latter to the former, of a disk fixed to the armature shaft and provided with a shoulder, a dog pivoted to a fixture for engagement with said shoulder, and a knock out arm carried by said driving member and adapted to move said dog out of engagement with said shoulder.

4. The combination with the armature shaft of a magneto, a concentric driving member, and a spring through which motion is transmitted from the latter to the former, a disk fixed to the armature shaft and provided with a shoulder, a dog pivoted to a fixture for engagement with said shoulder, a knock out arm carried by said driving member and adapted to move said dog out of engagement with said shoulder, and a spring buffer carried by the disk and adapted to engage said knock out arm.

5. The combination with the armature shaft of a magneto, a concentric driving member and a spring through which motion is transmitted from the latter to the former, a disk fixed to the armature shaft and provided with a shoulder, a dog pivoted to a fixture for engagement with said shoulder, a knock out arm carried by said driving member and adapted to move said dog out of engagement with said shoulder, a buffer plunger movably mounted in a lug carried by said disk in position to engage said knock out arm, a pawl carried by said disk and having a beveled end adapted to engage a beveled notch in the driving member, and a spring interposed between said buffer plunger and pawl and acting on both.

6. The combination with the armature shaft of a magneto, a hub provided with a disk fixed to said shaft, a driving member rotatably mounted on the shaft and having a housing which overhangs said hub, a volute spring within said housing, and having its ends fixed thereto and to said hub, said housing having a V-shaped notch in its periphery, a spring pawl mounted on the disk and having a V-shaped tooth for engaging said notch, a dog pivoted to a fixture and